PNEUMONIA

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Pneumonia has been defined by some as an acute infectious disease due to the invasion of the lung by a variety of bacteria which grow in a fibrinous exudate, generating a toxin, which is absorbed into the general circulation; by others as an acute disease which is infectious. That it is acutely infectious is doubtful, except in epidemic form. It is regarded as epidemic when a whole village or locality is affected; and isolated epidemics occur in schools, barracks, and families. In addition to these we must class as infectious especially those pneumonias which are of influenzal origin.

Osler tells us that pneumonia is the most widespread and most fatal of all acute diseases, and the census reports of the past few years give an increasing death-rate. In the city of Toronto during the month of January, 1904, there was an increase of sixty-three per cent. in the death-rate over the same month of 1903. One week of December, 1902, in Chicago, pneumonia claimed twenty-seven per cent. of the total mortality. In the last five weeks of 1903 there were eight hundred and eighty-nine deaths in Manhattan alone from this cause, as against five hundred and eighty-six for the corresponding period of the previous year.

Flint says that in seventy per cent. of cases of pneumonia occurring in a house previously free from the disease it was found that the person attacked had been in more or less intimate relation with a patient suffering from pneumonia.

As an example of epidemic occurring in isolated form we might take that of a family in the city of Toronto; the family consisted of father, mother, two daughters, and one son; all developed pneumonia within a short time of one another. The father died in St. Michael's Hospital; one daughter also died there; the other daughter and the mother recovered. The son was taken to the Children's Hospital, where he also died. The nurse in attendance on the child developed pneumonia and died.

General epidemics have been traced from the sixteenth century onward, and nearly all of these have been of the asthenic or typho-pneumonia type. Italy and France have had widespread epidemics from that period. North America suffered from an epidemic from 1812 to 1825. But our first accurate knowledge of infectious epidemic pneumonia dates back to 1888, when an epidemic at Middlesborough, England, was carefully investigated by Dr. Ballard, and later an epidemic in Lincolnshire by Dr. Parsons.

Kline demonstrated a bacillus in these two epidemics which could be cultivated, and which produced epidemics in monkeys and guinea-pigs.

Friedländer has also described an oval capsulated coccus in infectious pneumonia; the bacillus of influenza has also been found in epidemics.

CAUSES.—Fränkel has maintained that all cases of true acute lobar pneumonia are due to a pneumococcus which was first discovered in the sputum, and, according to Netter, was found in the mouths of twenty per cent. of healthy persons; but, as we will briefly note, other causes are to be reckoned with.

We know that bad hygienic surroundings, poor food, bad drainage, and exposure, which used to be considered exciting causes, are now considered simply predisposing factors in ordinary pneumonia by lowering the resistance of the bronchial and pulmonary tissues.

The disease is not influenced by climate. It ravages the far North and the sunny South. No race is exempt; the negro and the white man are subject to the same exposure and danger. While it occurs at all times of the year, the seasons of variations in temperature and raw east winds are the most prevalent for the epidemic form. "Winds are carriers of dust as well as abstracters of heat." In Britain and America the mortality is highest in the winter and the spring months.

SEX AND AGE.—In epidemics we find that the rate of attack per one thousand of population increases greatly with the advance of years, as does the mortality. In Dr. Ballard's statistics the case mortality is lower among females than among males, except at an age above sixty-five. These facts are not borne out by the statistics of ordinary pneumonia, where we find that young adults are most often affected, and that the disease, though more common among males than among females, is more fatal among the latter.

We quote the following table from an American authority:

Years of age.	Death rate.
1 to 5	30.00 per cent.
6 to 10	3.84 per cent.
11 to 20	10.05 per cent.
21 to 30	8.70 per cent.
31 to 40	24.70 per cent.
41 to 50	39.30 per cent.
51 to 60	43.10 per cent.
61 to 70	63.60 per cent.
71 to 80	86.70 per cent.

The importance of injury as a cause of an attack of pneumonia is advocated by Litter, who states that of three hundred and twenty cases of pneumonia 4.4 per cent. were due to contusion. Now, inhalation of chemical irritants must also be classed as a causative factor of pneumonia, in which case the pneumococcus has been found to be sometimes present, sometimes absent. Before leaving the subject of inhalation as cause of an attack, we must mention those pneumonias following anæsthetics, more especially of ether, also after illuminating gas. In these last two the inhalation of the gas acts again as a predisposing cause. The infection, whether it be pneumococcus, or the influenza bacillus, or any of the others, is present in the mouth, or subsequent to the inhalation enters the lung, and finds conditions best suited to its development, the ether or gas having produced an inflammatory reaction in the tissue-lining of the lung and caused an exudate from the tissue in which the germs can grow as readily as in the bouillon-tube in the incubator.

VARIETIES.—We will briefly touch on the varieties of pneumonia. It is roughly divided into two groups—first, lobar, croupous, fibrinous, etc., and, second, into lobular or broncho-pneumonia. Lobar pneumonia is again subdivided depending on the origin of the infection, such as typho-pneumonia, influenza pneumonia. Now broncho-pneumonia may be roughly regarded as a severe bronchitis, in which the temperature rises above one hundred and two and one-half degrees; in this latter case the lobules are invaded and the consolidation is therefore patchy, the whole lobe not being involved. You might ask whether in lobar pneumonia the whole lobe is invariably affected. This is not necessary, as a strip pneumonia, such as is often seen in the typhoid and influenza type, could not be classed as a broncho-pneumonia; still, the whole lobe is not involved, but more generally a strip of consolidation posteriorly, including all lobes.

DEPICTED IN A TYPICAL CASE.

We will first consider the principal features as we commonly see them, then take up the symptoms separately, considering their variations from the picture we have in our mind, but to which all pneumonias do not conform.

The period of incubation in typical, frank pneumonia is about two days, during which time the patient often suffers from headache, malaise, and a catarrhal condition of the pharynx and nose.

The onset of the disease is generally ushered in by a chill, the severity of which is not in proportion to the disease, which is followed by a rapid rise of temperature with symptoms characteristic of fever.

Pain is also complained of, generally in the mammary region of the side affected. Dyspnœa is also noted at this time, due at first to the pain felt during deep respirations, which renders it necessary that the respirations be quicker and shallower; later it is due to the engorged condition of the lungs, which in turn gives bloody, tenacious sputum, associated with distressing cough.

The engorgement of the lungs progresses for about two days, the pain becoming a less marked symptom, leaving the patient at the end of this time with an anxious expression, flushed cheeks, rapid respirations, and a rapid pulse of high tension. Now it is that the delirium may manifest itself; consolidation is taking place, and with it the sputum assumes a viscid, rusty appearance, due to the diminished number of blood-corpuscles and changes in the blood which exuded from the vessels during the stage of engorgement. This condition lasts three or four days, the disease ending by crisis from the fourth to the ninth day, but usually on the seventh day. The respirations become less labored, the temperature falls, as does the pulse-rate, whilst the sputum continues to be expectorated in an increased quantity. Such is a short account of an ordinary attack of pneumonia, but to which there are numberless exceptions.

We will now take up some of the points and consider them separately.

PAIN.—Pain is usually sudden in its onset and is aggravated by every movement of the chest and respiration. The pain is commonly stabbing in character and may be found at any point of the thorax, but usually about the nipple of the affected side. It has been noted not infrequently to be situated in the abdomen, where it may be very severe and mislead one in diagnosis. The stabbing pain is usually due to accompanying pleurisy, whilst the dull ache is supposed by some to have its seat in the lung substance. The pain, as has been noted, generally disappears to a great extent as the disease progresses—movement of the affected lung being less, the friction of the pleural surface is diminished.

COUGH AND SPUTUM.—The cough is, during the initial stage, short and of a distressing, hacking character, but later becomes freer and less painful. At first the sputum is very small in amount, but as the stage advances it becomes frothy and tenacious, so that when the sputa-mug is everted the sputum is seen to stick to the bottom like mucilage. Blood of a bright red color is seen at this stage. As consolidation takes place the sputum becomes less in amount and assumes a rusty character, but still retains its viscosity. The expectorated material is composed of fibrinous casts from the alveoli, leucocytes, blood-cells, epithelial cells, and bacteria. Sometimes, instead of the thick, tenacious sputa, we find a thin, dirty expectoration which has been termed "prune-juice" sputum—usually of bad significance, as it points to the hemorrhagic element being very marked, the toxic condition greatly increasing the permeability of the vessel wall.

In epidemic pneumonia the cough is not a marked feature, the sputum having the characteristics of that of ordinary pneumonia, but in the pneumonia due to the influenza bacillus and in that associated with typhoid, malaria, etc., the sputum is often greater in quantity and of a purulent type.

CHILL.—The onset, as we have said, is sudden and marks the time when the bactericidal property of the blood is no longer able to cope with the organisms or, putting it in another way, the natural property of the blood is no longer able to neutralize the toxine produced. The severity of the chill varies, depending to a great extent on the virulence of the organism. Although we have said that it has no relation to the severity of the disease, we must modify this by saying that it is in direct relation with the severity of infection. The cases where it is absent are usually of the broncho-pneumonia type, and in children it is often missed.

RESPIRATION.—Respiration early becomes rapid on account of the pain. Deep inspiration being impossible, the patient is forced to breathe more rapidly. Another effect on the respiration is the action of the toxin produced by the bacteria in the lungs on the nervous system; and later the toxins retained in the blood by its poor aeration, the carbon dioxide acting upon the respiratory centre in the fourth ventricle. In addition to these causes we have limited air-space in the lung. Not only is that part of the lung which is solid thrown out of work, but also there is a condition of congestion and swelling of the air-cells in the rest of the lung, which adds to the lack of air-space.

The normal average of the pulse-respiration ratio is 4:1; but in this disease it is changed, the ratio being sometimes as low as 2:1, occasionally even lower in children, whose nervous mechanism is more markedly affected. After the crisis the respiration rate falls, but not immediately, to normal. The fact that the respiration falls, while the air-space is not correspondingly increased, leads one to suppose that the increase of respiration is largely due to the toxæmia or poisoning.

PULSE.—The pulse is, in the ordinary type of pneumonia, at first full and of high tension, becoming more compressible as the disease advances, when it becomes more or less affected by respiratory movements. In the cases showing marked prostration from the beginning it is of a poor quality and may early assume a dicrotic type. In children the pulse may run very high, as high as 150 or 160, yet the danger is not proportionately great. In connection with the pulse we might state that we should let the physician know immediately when the pulse does not seem to be in proportion to the movements of the heart—a small pulse and a heart that seems to be beating strongly being indications of serious pulmonary obstructions and possibly of commencing failure of the right heart, and denotes that the right heart must be strengthened as much as possible.

NERVOUS SYMPTOMS.—As before mentioned, delirium may set in during the stage of congestion. This is especially the case in alcoholics and in the apical pneumonias. Why this latter should be the case we do not know, various theories being advanced. In children the disease is often ushered in by convulsions, which apparently take the place of a chill. This is occasionally the case in adults, and we may mistake such cases, especially in adults, and think of uræmia or meningitis, two such cases occurring recently in Toronto.

The one was a case entered at St. Michael's Hospital, who apparently was suffering from uræmia. Shortly after his entrance convulsion followed convulsion, and the patient died next day. At postmortem it was found that both lungs posteriorly were in the state of engorgement—the commencement of pneumonia. The other was a case at the Toronto General Hospital, where a provisional diagnosis of meningitis was made; the head was retracted and turned to the right, eyes turned also to the right, limbs rigid and patient unconscious—in fact, everything seemed to point to basal meningitis. Yet at autopsy pneumonic consolidation was found. These cases are, as a rule, of the influenzal type or where the virulence of the pneumococcic infection was very great. In neither of these cases was there found any evidence, postmortem, of either kidney or meningeal changes, the meningeal symptoms being due to the toxæmia. Cases such as these should be watched—in fact, any delirium in pneumonia should be watched carefully.

CRISIS.—The disease, as we have stated, usually ends by crisis; this is also the case in the epidemic form, but not as a rule in the influenzal or typhoid types, in which the disease often ends by lysis; this may be due to the pleurisy so often accompanying the pneumonic process.

According to Fowler the days on which the crisis occurs most frequently are as follows—twenty-two per cent. on the seventh day, sixteen per cent. on the fifth, twelve per cent. on the sixth and eighth, and ten per cent. on the ninth day. Many theories regarding the crisis have been advanced, the most likely being that sufficient amount of antitoxin is produced to neutralize the action of the toxin by the organism causing the disease.

Cause of Death.—When death occurs early in the disease it is, as a rule, due to the virulence of infection; later it may be due to failure of the right heart. Another cause is the loss of air surface, the patient dying from asphyxia. This last is held to be very important by some.

Complications, such as myo- or endo-carditis, venous thrombosis, meningitis, empyema, and especially otitis media in childhood, often carry off patients who would have recovered from the pneumonia. From the table we have quoted it will be seen that the mortality in children is about a third as great as in adults.

Nursing of pneumonia will be considered in the next number.

(To be continued.)

A NURSE'S WORK AS APPLIED TO DISEASES OF THE EYE AND EAR*

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It is a notorious fact that every teacher thinks his particular branch is the paramount one, and in the effort to impress it on the students he buries them under such a mass of facts that they emerge retaining but few of them, and in many instances the ones of least importance.

In the present day and age the practice of ophthalmology, otology, rhinology, and laryngology is entirely dissociated from general practice.

To be sure, the specialist must have a good kmowledge of general medicine, and only those who possess such a knowledge will attain the highest rank in their profession and their specialty, but it is a well-established fact that it is to the advantage of the specialist, the general practitioner, and the patient that this distinction be made. This fact, together with the requirements in hospital construction, management, and nursing for this class of cases, has led to the establishment of special hospitals for this work with its consequent curtailment in general hospitals.

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